A Guide to Hazardous Waste Management for Florida's Laboratories

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WHY SHOULD I CARE ABOUT HAZARDOUS WASTES?

As a laboratory owner, operator or employee, you may be producing materials that can harm people and the environment.
This booklet offers helpful tips on how to:

- comply with federal and state hazardous waste regulations.
- avoid penalties by properly managing hazardous wastes.
- save money on disposal costs by reducing hazardous wastes.

Health and Environment

- Hazardous wastes spilled or dumped on the ground or disposed of in dumpsters may seep into the groundwater and contaminate drinking water supplies.

- Hazardous wastes may run off into the nearest body of water where they may poison or kill fish and other wildlife.

- Hazardous wastes pose a health risk to you, your employees and your community.

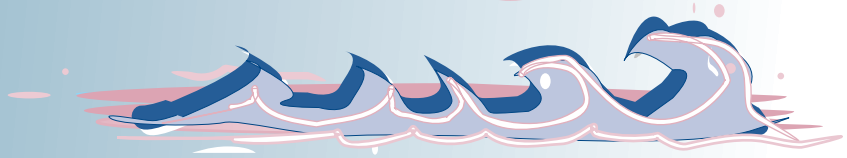
Cost Savings

- State and county inspectors may visit your laboratory to ensure that hazardous wastes are being managed properly. State penalties may range from $100 to $50,000 per violation per day.

- Reducing hazardous wastes can reduce your production and disposal costs and reduce your liability risk.

Public Image

- Your customers will appreciate your efforts to prevent pollution. Your community will recognize your laboratory as a good neighbor.



WHAT IS HAZARDOUS WASTE?

A waste is hazardous if:

- it has any of the characteristics described below.
- it is listed as a hazardous waste in the Code of Federal Regulations, 40 CFR Part 261.

Characteristic Wastes

Ignitable

Ignitable wastes are easily combustible or flammable. If they have a flashpoint of 140° F or less or an alcohol content of 24% or more, they are hazardous wastes. Examples include alcohols and chromates (oxidizers).

Corrosive

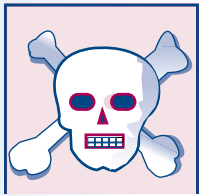
Corrosive wastes corrode metals or other materials or burn the skin. These liquids have a pH of 2 or lower or 12.5 or higher. Examples include strong acids and bases.

Reactive

Reactive wastes are unstable and may explode or react rapidly or violently with water or other materials. Examples include sulfides, cyanides, and crystallized (dry) picric acid.

Toxic

Wastes are toxic if they contain certain heavy metals, such as chromium, lead, mercury, or cadmium, or toxic organic chemicals. Examples include benzene, trichloroethylene, and tetrachloroethylene.



Listed Wastes

A waste is hazardous if it is listed in the Code of Federal Regulations, 40 CFR Part 261. For details on listed wastes and waste code numbers, contact the Florida Department of Environmental Protection. (See page 15 for DEP phone numbers.) The Code of Federal Regulations is available at most libraries or may be purchased from the U.S. Government Bookstore (phone 904-353-0569).

Acutely Hazardous Wastes

Small amounts of very dangerous wastes, such as arsenic and cyanide compounds, are regulated in the same way as large amounts of other wastes. A laboratory that generates 2.2 pounds (1 kilogram) or more of these acutely toxic wastes per month is subject to full regulation under the hazardous waste rules.

Identifying Your Hazardous Wastes

It is very important to determine whether a waste is hazardous or non-hazardous. There are several ways to identify hazardous wastes.

- Obtain and read Material Safety Data Sheets (MSDS).
- Talk to product suppliers and manufacturers.
- Read product labels.
- Compare product and process information to hazardous waste characteristics and to wastes listed in federal regulations.
- If product or process information is not available or is inconclusive, have a commercial lab sample and test the waste using the TCLP test.
- A non-hazardous material or product may become a hazardous waste due to contaminants added during use. Lab testing may

SOURCES OF HAZARDOUS WASTE

- **Spent solvents . . .**
  used in cleaning, extraction, or other processes.

- **Non-empty solvent containers/aerosol cans.**

- **Testing samples . . .**
  if they are not entirely consumed by the test procedure.

- **Unused reagents . . .**
  that are no longer needed, do not meet specifications, are contaminated, have exceeded their storage life, or are otherwise unusable in the lab.

- **Reaction products . . .**
  of known or unknown composition. Try to identify reaction products and label them for proper disposal.

- **Absorbents . . .**
  used to clean up hazardous wastes.

- **Contaminated materials . . .**
  such as glassware, gloves, paper, and plastic products.

- **Used chromatograph vials.**

- **Gas cylinders.**

- **Mercury spills.**

TYPICAL HAZARDOUS WASTES

ACIDS/BASES
(corrosive)
Acetic acid
Ammonium hydroxide
Hydrochloric acid
(muriatic acid)
Nitric acid
Oleum
Potassium hydroxide
Sodium hydroxide
Sulfuric acid

REACTIVES
Calcium metal
Dry Picric acid (should not be disposed of by untrained personnel)
Potassium cyanide
Potassium metal
Sodium hydride
Sodium sulfide
Stannic chloride

OXIDIZERS
(ignitable)
Ammonium chromate
Chromium trioxide
Lead chromate
Manganese dioxide
Potassium dichromate
Potassium permanganate
Silver nitrate
Sodium bromate
Sodium chromate

SOLVENTS
(ignitable)
Acetone
Benzene
Ethanol
Ethyl ether
Formaldehyde (potential)
Hexane
Isopropanol
Methanol
Methylene chlorides
Methyl ethyl ketone (MEK)
Pentane
Pyridine
Tetrahydrofuran
Toluene
Xylene

TOXICS
Acetaldehyde
Allyl alcohol
Barium
Carbon disulfide
Carbon tetrachloride
Chloroform
Chromium
Hydrazine
Lead
Mercury
Naphthalene
Sodium azide

For more information on hazardous wastes, contact DEP. (See page 15 for DEP phone numbers.)

HOW SHOULD I MANAGE HAZARDOUS WASTES?

First, determine how much hazardous waste you generate each month. The rules you must follow depend on how much you generate, how much you store, and how long you store it.

- **Less than 220 pounds** (100 kilograms or about half a drum): you are a “Conditionally Exempt Small Quantity Generator.”
- **220 - 2,200 pounds** (100 - 1,000 kilograms or about half a drum to 5 drums): you are a “Small Quantity Generator.”
- **More than 2,200 pounds** (1000 kilograms or more than about 5 drums): you are a “Large Quantity Generator.”

The following practices may be required for your laboratory. Even if they are not required, they are good waste management practices. Additional information is available from DEP.

Containers

- Maintain containers in good condition. Prevent leaks, ruptures and accumulation of rainwater on tops of drums.
- If a container leaks, transfer waste to a new con tainer.
- Keep containers closed and use self-closing funnels. Do not allow wastes to evaporate.
- Wastes must be compatible with the container. For example, use HDPE plastic containers for corrosive wastes.
- Never place incompatible wastes, such as wastes that react with each other (acids and bases), in the same container.

Storage

- Maintain adequate aisle space between container rows to allow inspection for leaks and damage.
- Store ignitable and reactive wastes at least 50 feet from property boundaries.
- Store containers of incompatible wastes in separate areas.
- Be aware of allowable time limits for storage.

Labels

- Label every container with the type of waste and whether it is hazardous or non-hazardous.
- Include federal waste code numbers.
- Include the accumulation start date (the date when waste was first placed in the drum).
- Include your laboratory name and address.
- Use the following words on labels for hazardous wastes:

HAZARDOUS WASTE
FEDERAL LAW PROHIBITS IMPROPER DISPOSAL

If found, please contact the nearest police or public safety authority or the U.S. EPA

(Your business's name and address and manifest document number)

Transport and Disposal

- Make sure your transporter and disposal facility have EPA identification numbers.
- Use manifests for all hazardous wastes shipped offsite.

Inspection and Recordkeeping

- Inspect containers at least once a week and keep a written log of container inspections.
- Keep training and inspection records for 3 years.
- Keep manifests and shipping receipts for 3 years.
- Keep records of lab tests for 3 years.
- Keep land disposal restriction forms for 3 years.

Training

- Train all employees to identify, reduce and properly handle wastes.
- Train new employees before they handle hazardous wastes.

HOW CAN I REDUCE HAZARDOUS WASTES?

Reducing hazardous wastes in your laboratory makes sense. Benefits include:

- Saving money on waste management costs.
- Reducing concerns about penalties and liability.
- Creating a safer, healthier workplace.
- Promoting positive public relations with clients, customers and the local community.

How Do I Begin?

- Make a commitment to reducing wastes in every area of your laboratory's operations.
- Evaluate your laboratory's wastes and identify areas where changes can be made.
- Encourage the participation of all laboratory personnel through education, training, and incentives.

Purchasing

- Save money by ordering smaller quantities of chemicals and reducing the need to dispose of excess chemicals.
- Purchase smaller packages of chemicals to reduce storage requirements and reduce the risk of breakage and accidents.
- Purchase gas cylinders from vendors who will take back the empty cylinders.
- Purchase chemicals from suppliers who will take back unopened chemicals.
- Purchase supplies from vendors who promote small quantity purchases and who will accept returns of unopened bottles.

Inventory

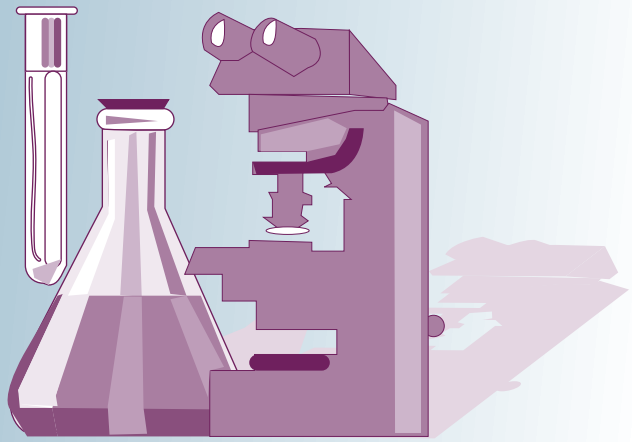
- Use older chemicals first.
- Use the chemicals in the stockroom first before ordering new products.
- Label all chemicals with date of manufacture.
- Create an effective inventory system to reduce waste.
- After inventory is reduced, prevent accumulation of new inventory.
- If a constant stock is required, perform an inventory review at least once a year.

Laboratory

- Do microscale experiments using smaller vessels and smaller amounts of chemicals.
- Do one-pot reactions where one reaction's product can be a starting point for another reaction.
- Use water-based solvents.
- Perform in-lab treatment of waste including neutralization, separation, fixation, oxidation, precipitation, degradation, or ion exchange.
- Reuse acid mixtures for electroplating.

Clean Up

- Use detergents and hot water instead of chromic acid solutions to clean.
- Recover noble metals such as mercury and silver.
- If possible, convert waste to product for another reaction.
- Train all personnel to use smaller amounts of chemicals and to properly dispose of waste.



WHO NEEDS TO KNOW IF MY BUSINESS GENERATES HAZARDOUS WASTES?

Notify DEP

➤ If your business is a small or large quantity generator, notify DEP to obtain an EPA identification number. Local environ mental agencies should also be notified.

Notify Local Authorities

➤ Police and fire departments and local hospitals who would respond to an emergency need to know that there are hazardous wastes on your property.

Designate an Emergency Coordinator

➤ This person must know what to do in case of a fire, spill or other emergency and must be on the premises or on call 24 hours a day.

Develop a Contingency Plan

Guidance on contingency plans is avail able from DEP. Large quantity generators must have a written plan that includes:

➤ Emergency response arrangements with police, fire, hospitals and emergency response contractors.
➤ Emergency coordinators' addresses and phone numbers.
➤ On-site emergency equipment descriptions and locations.
➤ Evacuation plan and routes, including a site diagram.
➤ Spill reporting procedures.

Post Emergency Information

Post the following information near every telephone:

CHECKLIST

This checklist will help you to prevent the most common hazardous waste violations.
For more detailed information on hazardous waste management requirements, contact DEP.

- ■ **Identify types and quantities of hazardous wastes.**
- ■ **Notify Florida DEP and obtain an EPA identification number from DEP.**
- ■ **Use proper containers to collect and store wastes.**
- ■ **Label all containers as hazardous or non-hazardous wastes.**
- ■ **Include accumulation start dates on labels.**
- ■ **Keep containers of hazardous waste closed.**
- ■ **Maintain aisle space between containers for inspection.**
- ■ **Inspect containers weekly for rust, leaks or damage and keep inspection records for at least 3 years.**
- ■ **Never discharge hazardous wastes to a septic tank unless you have a DEP permit.**
- ■ **Train employees to properly handle hazardous wastes.**

WHERE CAN I GET MORE INFORMATION?

Additional information on hazardous waste reduction and regulations is available from many sources.

Florida Department of Environmental

District offices and the Tallahassee office offer technical assistance, fact sheets and other publications on hazardous waste regulations.

- **Hazardous Waste Compliance Assistance Program**
  Phone: (850) 488-0300
  Fax: (850) 921-8018

Available publications include:

Summary of Hazardous Waste Regulations
Requirements for Conditionally Exempt Small Quantity Generators
Requirements for Small Quantity Generators
Handbook for Small Quantity Generators of Hazardous Waste

Florida Small Business Assistance Program

The Small Business Assistance Program helps businesses with environmental concerns and problems related to compliance with air regulations. Assistance is confidential and staff experts have business experience.

- **Phone: (800) 722-7457**

U.S. Environmental Protection Agency

The EPA has published a series of industry-specific guidelines and handbooks on preventing pollution and complying with hazardous waste regulations.

- **RCRA Hotline: (800) 424-9346**

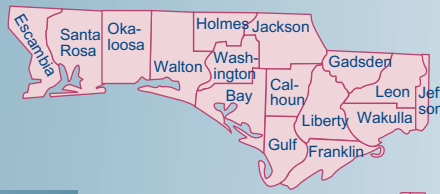
Your Trade Associations

Many trade and professional associations have published guides to help you find solutions to your hazardous waste management problems.

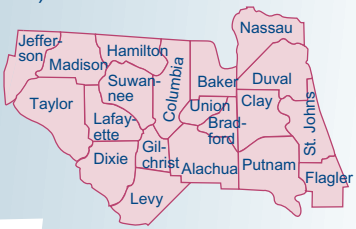
OFFICES OF THE FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION

Hazardous Waste Regulation Section
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400
(850) 488-0300

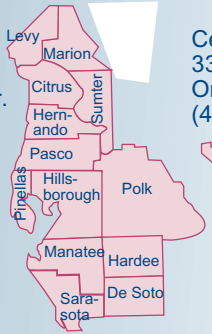
Northwest District
160 Government Center
Pensacola, FL 32501
(904) 444-8360



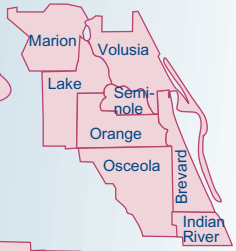
Northeast District
7825 Baymeadows Way, Suite 200B
Jacksonville, FL 32256
(904) 448-4300



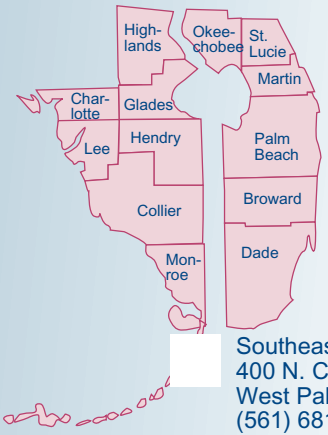
Southwest District
3804 Coconut Palm Dr.
Tampa, FL 33619
(813) 744-6100



Central District
3319 Maguire Blvd.
Orlando, FL 32803
(407) 894-7555



South District
2295 Victoria Ave., Suite 364
Fort Myers, FL 33901
(941) 332-6975



Southeast District
400 N. Congress Ave.
West Palm Beach, FL 33401
(561) 681-6600

University of Florida
Florida Center for Solid and Hazardous Waste Management
2207-D N.W. 13th Street
Gainesville, FL 32609
Phone: (352) 392-6264
Fax: (352) 846-0183

Non-Profit Organization
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Gainesville, FL

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Tallahassee, FL 32399-2400
Phone: (850) 488-0300
Fax: (850) 921-8018